

5/9/17

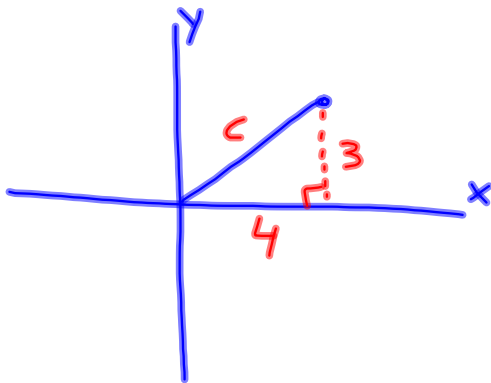
"If it matters to you, you will find a way. If it doesn't, you will find an excuse." -Unknown

HW: Test 2 Thursday 5/18

AIM: What is the Length of a Curve?

Warm Up:

1) How far is $(4,3)$ from the origin?



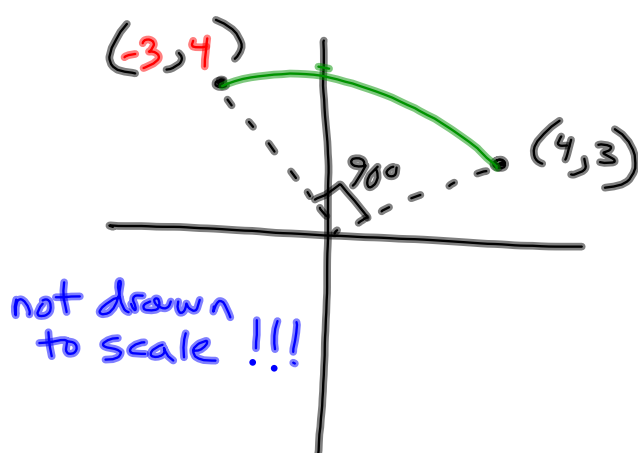
$$3^2 + 4^2 = c^2$$

$$9 + 16 = c^2$$

$$25 = c^2$$

$$5 = c$$

2) If we rotate $(4,3)$ 90° (counterclockwise) about the origin what are the new coordinates?



$(-3,4)$

3) What is the length of the green arc?

Find circumference and then divide by 4.

$$\textcircled{*} C = \pi d$$

$$r = 5$$

$$C = \pi 2r$$

$$C = 2(5)\pi$$

$$C = 10\pi$$

$$\frac{10\pi}{4} \approx 7.85 \text{ units}$$

⊗ The length of a curve $y=f(x)$
from $x=a$ to $x=b$ is:

$$\text{Length} = \int_a^b \sqrt{1 + (f'(x))^2} \, dx$$

⊗ $f'(x)$ is the derivative of $f(x)$

Verify that 7.85 is the length
of the arc between $(4,3)$ and $(-3,4)$.

The function is part of a circle
with center of $(0,0)$ with $r=5$.

$$x^2 + y^2 = 25$$

$$y^2 = 25 - x^2$$

$$y = +\sqrt{25 - x^2}$$

X-values?
-3 and 4

$$\text{length} = \int_{-3}^4 \sqrt{1 + (y')^2} \, dx$$

NORMAL FLOAT FRAC REAL RADIANT MP 

$$\int_{-3}^4 \left(\sqrt{1 + \left(\frac{d}{dx} (\sqrt{25 - XX}) \Big|_{X=X} \right)^2} \right) dX$$

7.85 ✓